

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/010528

International filing date (day/month/year)
29.03.2005

Priority date (day/month/year)
29.03.2004

International Patent Classification (IPC) or both national classification and IPC
A61K9/00, A61K41/00, B01J13/02, B22F1/00, B22F1/02, G01N21/55, B41J2/01

Applicant
THE UNIVERSITY OF HOUSTON SYSTEM

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

10/594708
IAP2 Rec'd PCT/PTO 28 SEP 2006
International application No.
PCT/US2005/010528

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 30 with respect to industrial applicability

because:

- ☒ the said international application, or the said claims Nos. 30 with respect to industrial applicability relate to the following subject matter which does not require an international preliminary examination (*specify*):

see separate sheet

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the whole application or for said claims Nos.
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☐ See separate sheet for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1,4-10,16-23,27,30

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1,4-10,16-23,27,30
Inventive step (IS)	Yes: Claims	
	No: Claims	1,4-10,16-23,27,30
Industrial applicability (IA)	Yes: Claims	1,4-10,16-23,27,29
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/010528

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item I

Basis of the report

- 1) The documents cited in the International Search Report (ISR) were numbered respectively from D1-D4; this numbering results from the citation order in the ISR and will be used for the procedure. Unless otherwise specified, the cited passages of each document in the ISR will be considered.

D1: WO 01/35081 A (THE PENN STATE RESEARCH FOUNDATION; NATAN, MICHAEL, J) 17 May 2001 (2001-05-17)

D2: US 2002/187347 A1 (HALAS NANCY J ET AL) 12 December 2002 (2002-12-12)

D3: US-A-5 023 139 (BIRNBOIM ET AL) 11 June 1991 (1991-06-11)

D4: US 2002/103517 A1 (WEST JENNIFER L ET AL) 1 August 2002 (2002-08-01)

- 2) Too many independent claims

Although claims 1-3,11-15 and 24-29, directed to a product claim, have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter, namely a composition, and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and **places an undue burden** on others seeking to establish the extent of the protection.

Hence, claims 1-3,11-15 and 24-29 do not meet the requirements of Article 6 PCT.

In order to overcome this objection, it would appear appropriate to file an amended set of claims defining the relevant subject-matter in terms of a single claim in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT). Applicant should take care however not to add subject-matter which extends beyond the content of the application (Art. 19/34 PCT).

Failure to do so or to give convincing argumentations might lead to the substantive examination of only the first independent claim and its appending claims. Furthermore the applicant should take note of the **non-unity objection** described herein.

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

- 3) Claim 30 relates to subject-matter considered by this Authority to be covered by the provisions of Rule 67.1(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of this claim (Article 34(4)(a)(I) PCT).

Re Item IV

Lack of unity of invention

- 4) The application lacks unity within the meaning of R.13 PCT for the following reasons :

The problem to be solved in this present application is to provide a nanostructure composition having similar or improved optical, electro-magnetic, electrical and/or magnetic properties such as e.g. plasmon resonance.

At least 3 different groups of technical solutions were identified in present application, namely the groups of invention as followed:

Group of invention 1: claims 1,4-10,16-23,27,30

A nanostructure composition comprising a nanoparticle core and a **nanoshell**, characterized in that both contain a conductive material which is the same or different, and said nanostructure composition does not contain a bio-compatible polymer coating.

Group of invention 2: claims 2,3,4-10,11-12,16-23,28,29,30

A nanostructure composition comprising a nanoparticle core and a plurality of

nanorods, characterized in that both contain a conductive material which is the same or different, and said nanostructure composition does not contain a bio-compatible polymer coating.

Group of invention 3: claims 13-15,16-23,24-26,30

A nanostructure composition comprising a nanoparticle core and **a biocompatible polymer coating**

The common concept between the groups 1-3 is a composition characterized in that the nanocore and another nanostructure part, both contain a conductive material.

This feature is already known from D1-D4, which show that the core and the shell contain **both a metal, preferably gold or gold sulphite or oxide, said materials have a conductive property** (see D1: see whole document and in particular p.7 L.7-15, p.23 L.6-20, D2: see Figures 1-3, Examples, claims 1-3,7,8,16,17, §12-16, D3: claims 16,19,26, D4: §176-179, Example 6, claims 5).

Therefore, the common concept between the groups 1-3 is not novel and/or not inventive.

Since present application provides 3 different nanostructure compositions, that is to say 3 distinguishable technical solutions, no unifying concept can be acknowledged.

The application relates to a plurality of inventions, or groups of inventions, in the sense of Rule 13.1 PCT. They have been divided as defined above. If the applicant pays additional fees for one (or more) not yet searched group(s) of invention(s), then the further search(es) may reveal further prior art that gives evidence of a further lack of unity 'a posteriori' within one (or more) of the not yet searched group(s). In such a case only the first invention in this (each of these) group(s) of inventions, which is considered to lack unity of invention, will be the subject of a search. No further invitation to pay further additional fees will be issued. This is because Article 17(3)(a) PCT stipulates that the ISA shall establish the International Search Report on those parts of the international application which relate to the invention first mentioned in the claims ('main invention') and for those parts which relate to inventions in respect of which the additional fees were paid. Neither the PCT nor the PCT guidelines

provide a legal basis for further invitations to pay further additional search fees (W17/00, point 11 and W1/97, points 11-16).

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

5) Novelty and inventive step according to Art. 33(2) and 33(3) PCT

- 5a) The subject-matter of independent claims 1 and 27 is not novel in the light of D1-D4 because these latter describe a nanostructure composition comprising a nanoparticle core and a nano shell, characterized in that both contain gold, gold sulfide or gold oxide, which are materials having a conductive property.
- 5b) Dependent claims do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see documents D1-D4 and the corresponding passages cited in the search report.
- 5c) Should the applicant renders the subject-matter of the present application novel by pointing out the importance a technical feature that is not described explicitly in prior art or by introducing into the claims the use of a **specific metal or a specific amount** or whatever, inventive step may be recognized **only if he demonstrates** that **a surprising and/or synergetic effect** (with support of experimental data comparing the properties of present and prior art compositions) is attributed to the distinguishing technical feature that the skilled man in the art will not be able to deduct from the prior art.

In the absence of a **surprising effect** directly attributed to the distinguishing feature or **evidence of a particular prejudice**, inventive step cannot be acknowledged because the introduced/distinguishing technical feature will be considered as an **obvious alternative** that the skilled man in the art will perform **routinely** in order not to interact with prior art.

Re Item VII

Certain defects in the international application

- 6) For the assessment of the present claim 30 on the question whether they are industrially applicable, no unified criteria exist in the PCT Contracting States. The patentability can also be dependent upon the formulation of the claims. The EPO, for example, does not recognize as industrially applicable the subject-matter of claims to the use of a compound in medical treatment, but may allow, however, claims to a known compound for first use in medical treatment and the use of such a compound for the manufacture of a medicament for a new medical treatment.
- 7) Contrary to the requirements of Rule 5.1(a)(ii) PCT, it seems that the relevant background art disclosed in the documents D1-D4 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

- 8) See the clarity objection herein in paragraph 2).
- 9) Any information the applicant may wish to submit concerning the subject-matter of the invention, for example further details of its advantages or of the problem it solves, and for which there is no basis in the application as filed, should be confined to the letter of reply and not be incorporated into the application.

The attention of the applicant is drawn to the fact that the application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed.

In order to facilitate the examination of the conformity of the amended application with the requirements of Article 34(2)(b) PCT, the applicant is requested to clearly identify the amendments carried out, no matter whether they concern amendments by addition, replacement or deletion, and to indicate the passages of the application as filed on which these amendments are based (see also Rule 66.8(a) PCT).

Preferably these indications should be submitted in handwritten form on a copy of the relevant parts of the application as filed.

- 10) The applicant is kindly requested to take account of the above objections and give **convincing argumentations**.

It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the applicant nevertheless regard some particular matter as patentable, an independent claim should be filed taking account of Rule 6.3(b) (I), (ii) PCT (two part form claim). The applicant should also indicate in the letter of reply the difference of the subject-matter of the new claim vis-à-vis the state of the art and the significance thereof.